

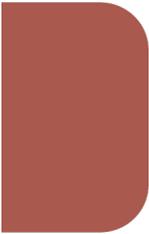
Role of Emerging Bioeconomy and Integrated Management of Non-Organic Agricultural Waste – Ontario Perspective

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and Rural Affairs



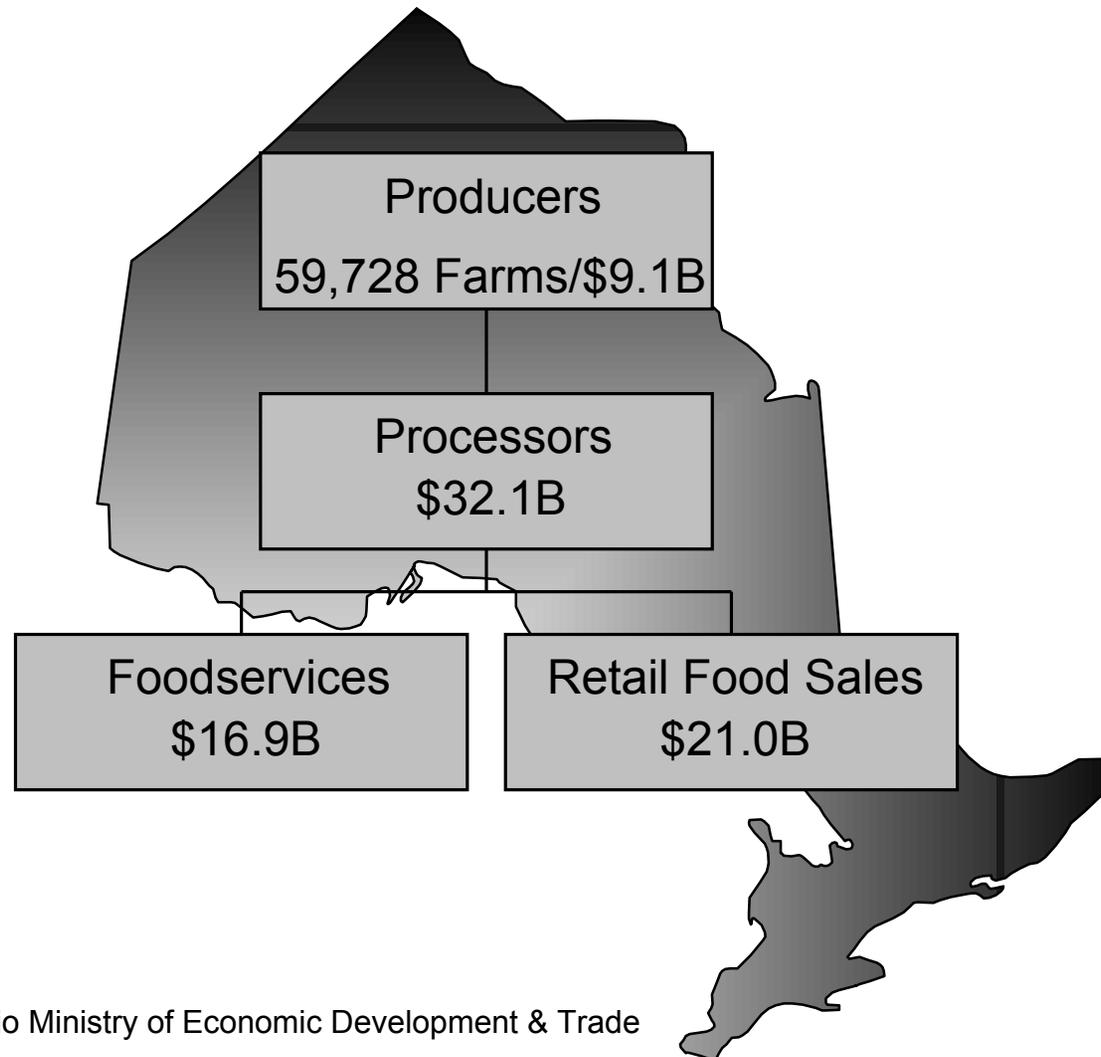
Outline

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- Ontario's Rural Economy
 - Ontario's Innovation Agenda and the Emerging Bioeconomy
 - Ontario's Approach to (Farm) Waste Management
 - Farmer Attitudes to Farm Waste Management
 - Waste Agricultural Plastics – Farmer and Industry Champions of Recycle/Recovery/Reuse End Markets

Ontario's Rural Economy

- Tremendous change last 50 years - rural population becoming more non-farm, farm consolidation and rapidly aging farm workforce. On average, Ontario farmers receive more income from off-farm.
- However, Ontario accounts for largest share of Canadian primary agriculture and food beverage processing exports (Ontario contributes 23% of Canadian total of \$39.6Billion).
- Ontario characterized by a high diversity of farm production – over 200 agricultural commodities
- Economic multipliers show for every \$1 in farm gate sales, \$2-\$3 generated in indirect sales; for each person employed in agriculture, 1 to 4 jobs supported in wider economy

Agriculture in Ontario – A well-developed supply chain network



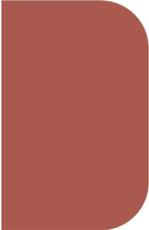
Source: Ontario Ministry of Economic Development & Trade

Innovation Agenda & Emerging Bioeconomy in Ontario

- **Ontario's Innovation Agenda** - \$3 billion/ 3 years - government/academic/industry partnership to support innovation in renewable carbon alternative energy and clean technology
- Some examples:
 - South Western Ontario Bioproducts Innovation Network (SOBIN)
 - U. of Toronto : Centre for Biocomposite & Biomaterials Processing (BDDC) and Centre for Renewable Energy & Sustainability (CARE)
 - U of Guelph: Centre for Bioproduct Discovery & Development (BDDC) - \$3M Research Chair in bioproducts from agricultural resources
 - U of Western Ontario Research Park Sarnia Lambton Campus- \$7.5M interdisciplinary research on chemical and fuels from ag. resources



Bioeconomy R&D Priorities

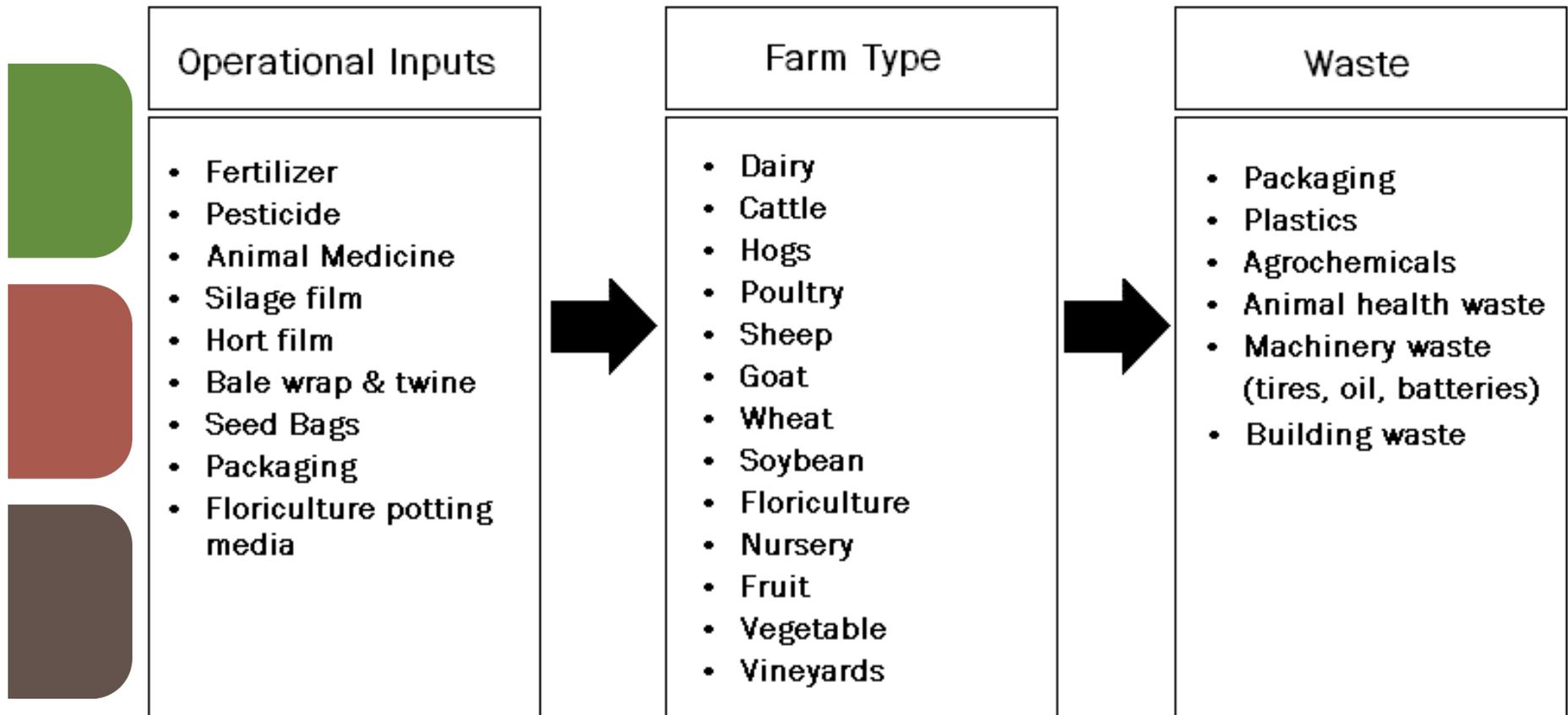
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- Biomass energy (heat and/or power) from purpose-grown crops and crop residues (potential farm-gate values over \$100M in five years) – *Miscanthus*, switchgrass are of most interest in Ontario
 - On-farm renewable energy technologies (anaerobic digesters – Feed-In-Tariff Program)
 - Biomaterials



Ontario's Approach to Waste Management

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- In 2004, Ontario government set an ambitious waste diversion goal for residential and IC&I sectors of 60% with aim of becoming a leader in waste diversion (current diversion rate was around 28%).
 - The Waste Diversion Act (2002) and Waste Diversion Ontario were established to help develop and operate waste diversion programs for specific wastes. To date, agriculture largely unaffected, 3R programs focused on municipalities
 - Ontario's waste diversion rate would be improved with a stronger adoption of waste-to-energy disposal practices, diversion of organics from residential sector into composting and maximizing IC&I recycling under the 3Rs.

Sources and Types of Ag Waste in Ontario

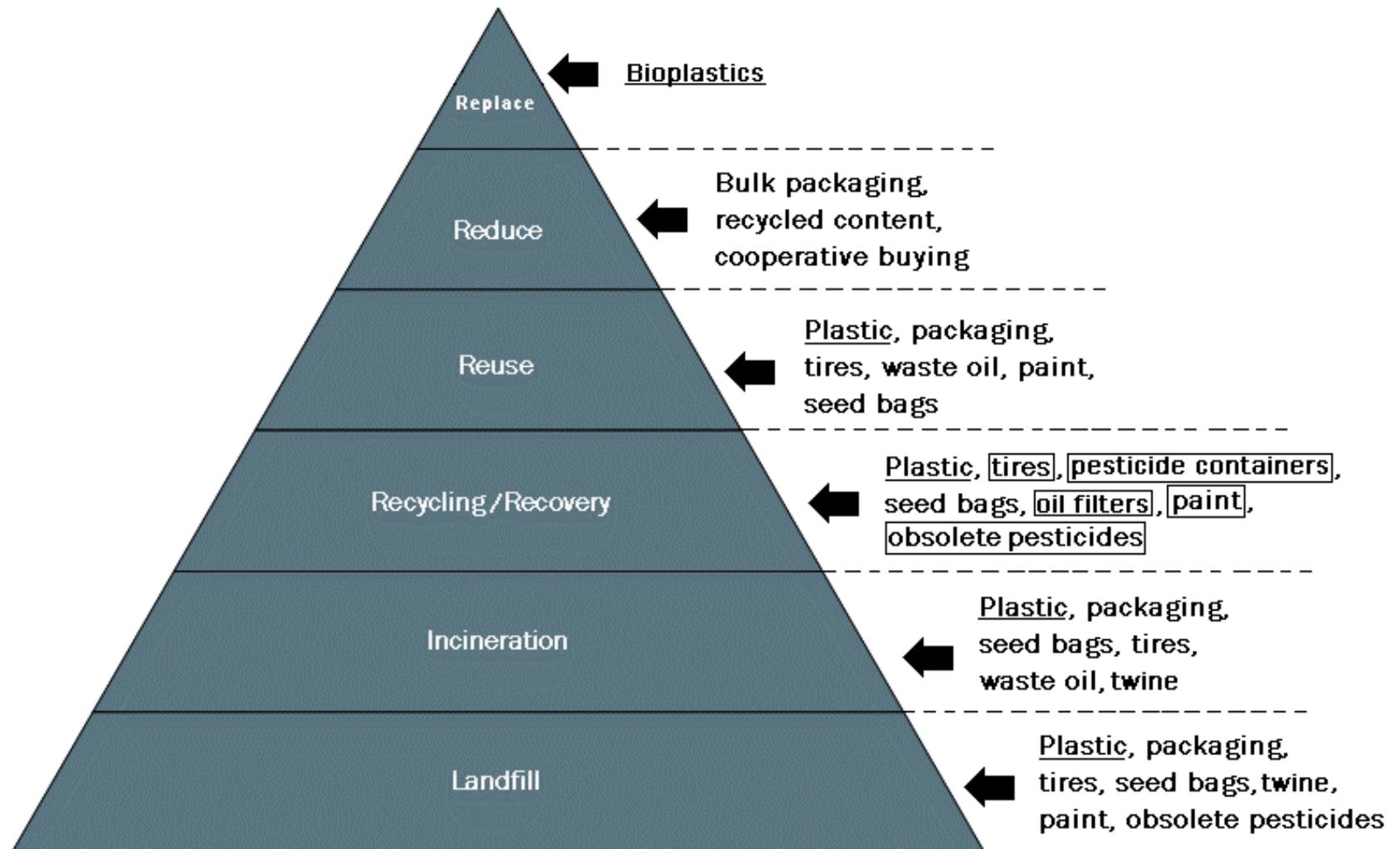




Current Practices to Manage Farm Waste by Ontario Farmers (2010 Farmer Survey Results)

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- Burned on farm
 - Farm landfill
 - Stored to take to safe disposal site
 - Stored to deal with it later
 - Re-used on farm
 - Included in household collection
 - Private waste contractor
 - Town landfill
 - Town recycling
 - Return to supplier or retailer
 - Return to a collection site

ISWM and Agricultural Waste Practices by Farmers in Ontario



Stewardship Programs for Agricultural Waste Management

- Stewardship programs in place for some ag waste products, no recycling programs for most ag. waste products (draft Recycling Handbook in preparation). Ontario needs to develop targets for general ag waste diversion and possibly targets for specific ag waste products such as plastics.
- From ISWM perspective, materials that are being burned or landfilled (by definition low on the hierarchy of ISWM pyramid) should be targeted for better recycling/reuse/reduction efforts by gov't and industry (move them to higher levels of ISWM pyramid in order to increase savings in material production, resource costs and energy).



Farmer Attitudes to Farm Waste Management

Ontario Farm Waste Producer Survey (2010) indicated a significant level of engagement and concern about this issue.

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- Farmers consider responsible disposal of waste to be a highly important issue, with 100% agreeing (83% strongly) that responsible disposal of agricultural waste is very important.
 - Moderate agreement that the agricultural industry is doing enough to ensure that there are responsible ways to dispose of their products.
 - Over half of farmers say they are not comfortable burning or putting certain wastes in the landfill, but don't see an alternative.

Agricultural Plastic Waste in Ontario

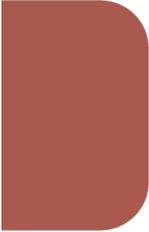
- In Ontario, ‘farmer’ champions and ‘industry’ champions are tackling the agricultural plastic waste challenge through different end markets
- Under Ontario’s bioeconomy agenda – ag waste plastic is valuable input to biofiber production, example, Switch Energy Corporation in Clinton, Ontario is developing biofibre production with switchgrass in parallel with balewrap recycling business
- Under Ontario’ Great Lakes protection agenda, the burning of agricultural plastic waste is a water protection/ pollution prevention issue, example, CleanFARMS is piloting watershed ag plastic waste collection and disposal initiative with watershed protection and farm community

Farmer Champion - Nott Farms

- Nott Farms (Clinton, Ontario) – One producer growing switchgrass for a variety of potential end markets such as biomass fuel, livestock bedding, biocomposite consumer products and biofuels (ethanol/biodiesel)
- Switch Energy is exploring the use of Notts Farm switchgrass with recovered greenhouse film waste plastic or waste balewrap from neighboring dairy farmers to make biocomposite materials and products (flower pots and bio-bins)
- 30% switchgrass, 10% bale wrap waste, 60-70% recycled polypropylene plastic
- www.SwitchEnergyCorp.com



Industry-led Champion – CleanFARMS and Lake Simcoe Watershed

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- In 2012, CleanFARMS will pilot the collection and management of agricultural plastic wastes that would otherwise have been burned or buried on local farms or at municipal landfills in the Lake Simcoe watershed area.
 - a. Agricultural films, including mulch and greenhouse films
 - b. Flower pots, trays, and inserts
 - c. Plant tags
 - d. Drip tape
 - e. Soil/ fertilizer bags
 - f. Seed bags
 - Supporting Organizations
 - 23 Municipalities bordering the Lake Simcoe Watershed
 - Holland Marsh Growers Association
 - Lake Simcoe Regional Conservation Authority
 - Ontario Agri-Business Association
 - Ontario Farm Animal Council

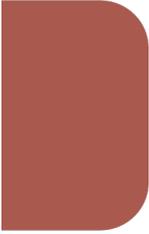


Future Considerations

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- Careful consideration should be given to public-private partnerships needed to develop an effective recovery scheme for agricultural waste plastics. Ontario is supportive of the development of biocomposite and recycled plastic end markets.
 - Consideration should be given on how best to include management of small quantities of waste plastic and other potentially harmful waste materials into diversion programs to help farmers avoid less desirable incineration & landfill practices .



Acknowledgements

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